Australian Curriculum Linked Lessons

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In providing a continued focus on tasks and activities that help to illustrate key ideas embedded in the new Australian Curriculum, this issue we focus, on Geometry in the Measurement and Geometry strand with strong links for an integrated focus on the Statistics and Probability strand.

	Number & Algebra	Measurement & Geometry	Statistics & Probability
Understanding			
Fluency			
Reasoning			
Problem Solving			

The following small unit of work on the sorting and classifying of shapes are activities that can be modified to meet the requirements of particular year level descriptors in the following aspects of the Measurement and Geometry strand. There is also a direct link to the Statistics and Probability strand through the collection, the classification and the recording of the data. Where appropriate, elaborations are listed beneath each content descriptor.

Measurement and Geometry – Shape and reason geometrically

Foundation Year — Sort, describe and name familiar two-dimensional shapes and three-dimensional objects in the environment (ACMMG009)

- sorting and describing squares, circles, triangles, rectangles, spheres and cubes

Year 1 — Recognise and classify familiar two-dimensional shapes and three-dimensional objects using obvious features (ACMMG022)

- focusing on geometric features and describing shapes and objects using everyday words such as 'corners', 'edges' and 'faces'

Year 2 — Describe and draw two-dimensional shapes, with and without digital technologies (ACMMG042)

- identifying key features of squares, rectangles, triangles, kites, rhombuses and circles, such as straight lines or curved lines, and counting the edges and corners

Year 4 — Compare angles and classify them as equal to, greater than or less than a right angle (ACMMG089)

Year 5 — Describe translations, reflections and rotations of 2D shapes. Identify line and rotational symmetries. (ACMMG114)

- identifying and describing the line and rotational symmetry of a range of two-dimensional shapes

Statistics and Probability

There is a continuum of development in this strand from Year 2 to Year 5 that will provide a focus for the collection, checking, classifying and organisation of data into categories and the creation of displays of data using lists, tables, picture graphs and column graphs. Teachers can use these activities to focus on the appropriate elements of the statistics and probability strand.

We would like to encourage any teachers trying these ideas with their classes to send in a short paragraph explaining what happened. Samples of children's work illustrating how they tackled these tasks would be appreciated. Likewise any assessment schemes that could be shared among colleagues would be welcomed.

Sheet A: Attribute cards

This sheet is designed to be copied onto A4 paper (or preferably coloured card).

Has only straight sides	All of the shapes with parallel opposite sides
Has at least one curved side	All of the shapes with more than six vertices
All of the rectangles	All of the shapes with at least one angle greater than a right angle
All of the triangles	All of the shapes with at least one angle less than a right angle
All of the quadrilaterals	All of the shapes with at least one right angle
All of the trapeziums	All of the shapes with all angles congruent
All of the hexagons	All of the shapes with all sides congruent
All of the octagons	All of the regular polygons
All the shapes with more than four sides	All of the pentagons
All the shapes with more than four corners	All of the shapes that have at least one line of symmetry
All of the convex polygons	All of the shapes that have more than one line of symmetry
All of the concave polygons	All of the shapes with rotational symmetry

Determination of which shapes are employed (Sheet B) should be based on the students' previous experience and the teacher's determination of the outcome for the lesson.

Activity 1: Sorting to a single criterion

The set of attribute cards (sheet A) and shapes (Sheet B) can be modified as required depending on the outcome for the lesson.

1. Each group is given a set of the shapes with which to work (Sheet B).
2. The attribute cards (Sheet A) are shuffled and laid face down in the middle of the group.
3. One of the students from the group collects a card and the group then satisfies the required attribute stated on the attribute card.
4. A recording possibility might be a photograph of the attribute and shapes that meet the criteria. The photos might be displayed on the classroom wall. Students might be engaged in classifying data and representing data with tables or perhaps Venn diagrams.

Activity 2: Sorting into two criteria

Sorting criteria should be developed according to the year level and content being addressed. For older year levels it would be advantageous to include criteria from previous experiences. Some examples of criteria to ask for, in sorting shapes (Sheet B) into two groups might include:

- all of the shapes with less than five sides and all the shapes with more than five sides;
- all of the shapes with some straight lines and all the shapes without any straight lines;
- all of the regular polygons and all of the other shapes;
- all of the shapes with less than four angles and all of the shapes with more than four angles;
- all of the concave polygons and all of the convex polygons;
- all of the quadrilaterals and all of the non-quadrilaterals;
- all of the shapes that have one or more sets of parallel sides and all of the ones that do not;
- all of the shapes that will tessellate and all of the ones that will not.

Activity 3: Sorting into three or more criteria

This same set of shapes (Sheet B) can be used to sort into three or more groups. This then can be completed in a similar way to activity 2 or it can be modified so that the students are determining the classifications to be employed. This can become a powerful vehicle for encouraging students to record their thinking in the form of tables, charts, Venn diagrams and graphs. Alternatively this activity can be accessed through an opportunity to explore analysis of data. Students may be provided with a table, column graph or other representation of data and they use that data to determine the classification criteria and portion of shapes that belong to each classification to recreate the physical sorting of shapes. Examples of sorting into three or more criteria might include:

- all of the shapes with less than three sides, all of the shapes with between three and five sides and all the shapes with six or more sides;
- all of the shapes with less than two obtuse angles, shapes with three or four obtuse angles and shapes with five or more obtuse angles.

Sorting activities such as these are easy to manage in a classroom environment, meet several curriculum objectives, provide the opportunity for students to be involved in thinking about the mathematics and also provide the teacher with an immediate tangible assessment item.

Sheet B

This sheet is designed to be copied onto A3 paper (or preferably card; a different colour to Sheet A) so that the shapes to be manipulated can be more easily handled.